REMARKS

This communication is in response to the Final Office Action of September 1, 2004. Claims 1, 8-17, 19, 20 and 25-43 were rejected.

Applicant respectfully requests that Claims 1, 8-17, 19, 20, and 25-43 be canceled without prejudice. The objections to the drawings and the claims are thus believed to be moot.

Applicant hereby submits new claims 44-55. The new claims include limitations supported by previously considered claims, the drawings, and portions of the specification describing the improved data rate associated with a low-inductance design (e.g., paragraph [00072]) and a collimated beam have an essentially permanent cross-section along a portion of an optical path to facilitate independent alignment of a laser diode and an optical detector (e.g., paragraphs [0045], [0048], [0065]).

Independent claims 44, 50, and 54 include as limitations "a first collimating lens unit for generating a collimated outgoing beam"; "a second collimating lens unit collimating light received from an optical fiber"; and that the "outgoing beam is collimated by said first collimating lens unit to have a substantially constant cross section from said first mirror to said optical fiber connection unit."

As described in Applicant's specification, one benefit of an optical module with collimated incoming and outgoing beams is that this configuration facilitates independent fine alignment of the laser, the optical detector, and the optical fiber connector. By way of contrast, an optical module with diverging or converging beams is difficult to align, because all of the optical elements must be adjusted simultaneously, as described in paragraph [0009].

Independent claim 44 also includes a limitation that the module is adapted for the laser diode and optical detector to be electrically coupled to a printed circuit board with an inductance sufficiently low to permit data rates of at least about one Gb/s. As described in Applicant's specification, in the prior art bidirectional optical transceivers with lens elements for high optical coupling efficiency typically had an orthogonal arrangement of the laser diode and optical detector, resulting in long lead wires and a

high inductance that restricted the speed of transmission, as described in paragraph [0017].

Applicant respectfully submits that the pending claims are patentable over the cited art. Althaus was the principal reference cited by the Examiner for 102(e) and 103 rejections. Althaus (U.S. Pat. No. 6,722,793) does not have a "first optical collimating lens unit for generating a collimated outgoing beam" and a "second collimating lens unit for collimating light received from an optical fiber into an incoming beam" as required by independent claims 44, 50, and 54. As can be seen in the Figure of Althaus, an arrow indicating an optical propagation direction and a cone indicating a converging beam are illustrated originating from the laser transmitter 4. The converging beam is focused onto a portion of the lamina filter/mirror 3 proximate optical fiber 2a.

In the embodiment shown in the Figure of Althaus, laser light must be generated as a converging beam in order for the light generated by the laser to be focused on the filter/mirror 3 near the optical fiber 2a in order to couple light into optical fiber 2a. (Note that the exemplary optical fiber 2a is described in column 2, lines 65-68 as having a total cladding diameter of 0.125 mm such that it would be understood by one of ordinary skill in the art that the laser light generated by laser transmitter 4 must converge to a comparable or smaller size to efficiently couple laser light to optical fiber 2a). Thus, Althaus teaches away from a first optical collimating lens unit for collimating an outgoing beam generated by a laser diode. Additionally, since there are no lens elements between mirror 3 and mirror 6, the incoming light received from the optical fiber will diverge (expand) as it propagates towards mirror 6 after exiting the comparatively small diameter of optical fiber 2a. Thus Althaus teaches away from a "second collimating lens unit for collimating light received from an optical fiber into an incoming beam."

Moreover, it would be inconsistent with the fundamental principal of operation of Althaus to add a "first optical collimating lens unit" and "a second optical collimating lens unit." This is because Althaus discloses a fiber pin 2 having a filter/mirror 3 especially designed to avoid the need for mounting a filter lamina within the optical module. Althaus teaches that the "essential advantage is that the module body or element can be manufactured more easily . . . [because] no special fastening elements for the later fastening of a filter lamina need be disposed or formed in the inner hollow space of the

hollow body." (column 2, lines 12-16). Applicant thus respectfully submits that the position of the filter/mirror 3 cannot be changed to a different location than on fiber pin 2 without fundamentally changing the fundamental principle of operation of Althaus, i.e., the "essential advantage" of simple manufacture afforded by attaching the filter/mirror 3 to the fiber pin. However, with a filter lamina 3 affixed to the surface of a fiber pin 2, additional collimation optics for collimating light from laser transmitter 4 would result in a broad beam that would not efficiently couple to the comparatively small diameter of optical fiber 2a.

Applicant notes that Keil (U.S. Pat. No. 4,767,171), cited as a 35 U.S.C. 103 reference in combination with Althaus, has an orthogonal geometry in which the laser diode and optical detector are mounted to two different, orthogonal surfaces. This geometry results in a high inductance, as described in the background of Applicant's specification. Consequently, Applicant respectfully submits that Keil teaches away from the geometry of Applicant's claimed invention.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is now in condition for allowance. The Examiner is invited to contact the undersigned if there are any residual issues that can be resolved through a telephone call.

The Commissioner is hereby authorized to charge any appropriate fees to Deposit Account No. 03-3117.

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